ONYX VALVE COMPANY

Model DHC

Installation & Maintenance

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STORAGE

Correct storage extends valve life. The rubber sleeve in the valve is perishable. Ideal storage conditions are 10°C (50˚F) and 60% relative humidity.

1. Keep valves and spare sleeves cool. They can be stored in an unheated area, but allow maximum ventilation in storage areas subject to high ambient temperatures. Truck trailers and storage sheds become incredibly hot during summer months. Avoid such locations.

2. Avoid sunlight. Ultra-violet light accelerates the deterioration of rubber. Leave the valve in its box. If not feasible to box the valve, cover the sleeve with black plastic.

3. Avoid ozone. DO NOT STORE valve near active electrical equipment. For long term storage, coat the face and inside the sleeve with silicone spray or liquid.

OPERATION:

The Onyx series CHP is a hand operated pinch valve. A simple hand-operated mechanism drives a direct acting pinch bar to close a rubber sleeve tight. Positive opening tabs molded into the sleeve attached to the pinch bar insure complete opening.

TESTING:

All Onyx pinch valves are tested to customer specifications before shipment. Unless otherwise specified, all valves are shipped assembled with all accessories mounted and calibrated.

DESIGN CRITERIA

The **maximum process temperature** that the valve can tolerate is based on the elastomer used to fabricate the sleeve.

Poly Isoprene	**Chloroprene**	**EPDM Ethylene Propylene**	**Nitrile**	**Butyl**	**Fluorocarbon**
PGR Pure Gum Rubber	**Neoprene**	**Nordel**	**Buna-N**	**Butyl**	**Viton**
-30°→+180° F -34°→+82° C	-20°→+220° F -29°→+104° C	-40°→+300° F -40°→+150° C	-30°→220° F -34°→104° C	-30°→+225° F -34°→+106° C	-15°→+375° F -26°→+190° C

The **maximum safe process pressure** that the valve sleeve and housing can tolerate is based on valve size and flange rating. For Onyx model CAR and CAP valves with 150# flanges maximum process pressure:

Size	½ -2	2½ & 3	4	6	8	10	12	14	16	18	20	24
P_{max} psi	200	175	150			100						

Notes:

1. Higher pressure ratings are available on special order.

2. This is the maximum safe pressure that the valve body can safely handle. The actuator is sized to close against the line pressure stipulated on the customer's PO and in most cases is significantly lower than max rated housing pressure shown here. Check name tag on the valve for maximum operating pressure based on actuator available thrust.

1. **Inspection:** Inspect the valve before installation. Report any shipping damage before installation. DO NOT INSTALL A VALVE KNOWN TO HAVE BEEN DAMAGED IN SHIPMENT. Check inside the valve to make sure no foreign objects are present.

2. Identification:

Part#. Use the part number shown on the unit tag when ordering spare or replacement parts.

Serial#

This is the pressure that the valve was tested at the factory prior to shipping.

3. Safety:

a) Leakage: Consider the possibility of leakage. Pinch valves handle abrasive fluids; it is reasonable to expect the rubber sleeve to eventually wear out and leak. Precautions should be taken where liquids may spray out or drip down onto electrical equipment or plant personnel or combustible fluid may drain into a dangerous area.

b) After shutting down: Pinch valves can hold pressure in a system for a considerable length of time. Means should be provided to safely relieve pressure and drain lines.

4. Flanges:

a. Onyx pinch valves are designed to work with standard ANSI 150# (or 300#) flanges.

b. No gasket is required; the sleeve face *is* the gasket.

c. Make sure the inside edges of mating flanges are filed or ground smooth. Any sharp edges on the inside corner of mating flanges will cut the rubber sleeve causing premature failure.

d. Valve flanges have through holes and are designed to have an ANSI hex (not heavy hex) nut behind the flange. Flange bolts must be inserted from the mating flange side.

e. Use **flat face flanges**. Do NOT use raised face flanges. Raised face flanges cut into the rubber sleeve damaging it.

f. Flange bolts must be installed through the mating flanges. Flange bolts cann**ot** be inserted from the valve side of the flange assembly.

5. Installation Design considerations:

a. If the valve is at the end of a pipe run, install a flange ring on the discharge end of the valve to seal the properly.

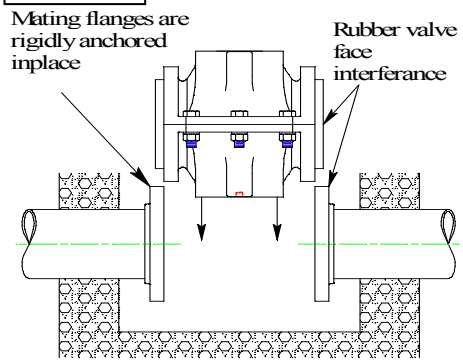
b. Design the installation so the valve can be removed and reinstalled later.

Pinch valve sleeves wear out and have to be replaced. The rubber sleeve is molded longer than the housing to provide enough compression in the rubber to prevent leaks. If mating pipe flanges are rigidly anchored in concrete or welded in place, you might be able to remove the valve from the line but there will be hell to pay when you attempt to reinstall it. The protruding rubber faces of the sleeve will thwart any attempt to get the valve back into place.

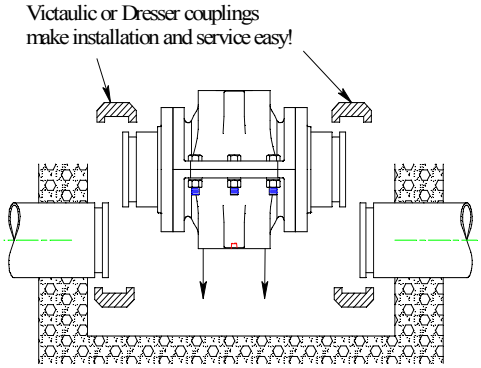
c. Using a Victaulic or Dresser coupling will facilitate removal and make it easy to reinstall the valve later.

By using split couplings, the mating flanges can be attached to the valve first and tightened prior to installation. Then the entire assembly can be dropped into place and secured with the split couplings.

Bad

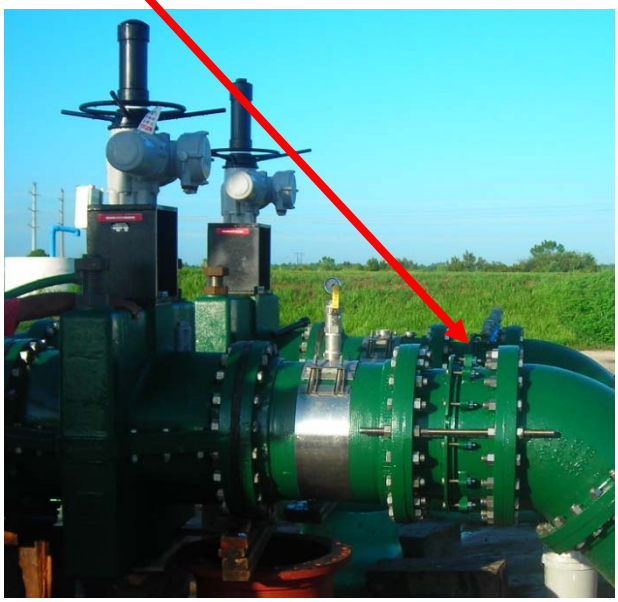


Good Design



Victaulic couplings.

Dresser coupling



6. On valves **for <u>any modulating service</u>**: Allow at least <u>2-pipe diameters</u> straight run into throttling valves as a minimum.

Good ⬇

Better ⬇

7. Valves for **On/Off service** can be connected directly to adjacent pipe fittings without straight run in or out.

Orientation:

There are 4-ways to install any pinch valve. 1 thru 3 are good. #4 is bad.

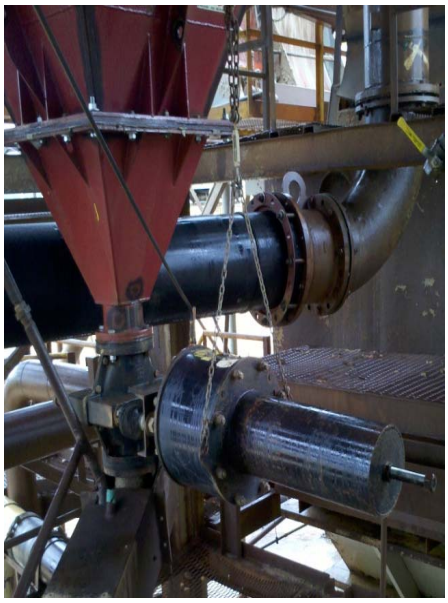
1. Valve upright in horizontal pipe. ➡
    i. OK for liquid applications.
    ii. OK for dry bulk applications.

2. 90° from vertical in horizontal pipe. ➡
    i. OK for liquid.
    ii. Do **NOT** install this way on **dry bulk** conveying!

3. Valve horizontal in vertical pipe. ➡

   i. OK for liquid.

   ii. OK for dry bulk applications.

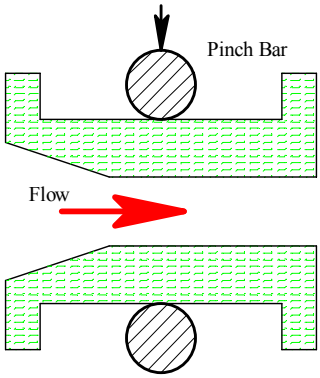


4. Valve at intermediate angle.

   i. Trouble brewing. Don't do this. ➡

Locate the valve where it can be reached for service and sleeve replacement. Allow access by technicians who may have to calibrate automatic valves. Allow access to the auxiliary hand wheel if valve was so equipped.

Be sure pipeline is clean. Foreign material left in the pipeline can damage valves. Clean the mating flanges of adjacent pipe. Remove any old gasket material.



Most pinch valves can be installed with flow in either direction.

Note: The exception: modulating valves with Trumpet Mouth (Taper-Inlet-Only) design. In this case there will be a Flow Arrow on the valve showing correct flow direction. The correct flow direction is always from the tapered end towards the non-tapered end.

Do not install valve next to a source of extreme heat.

CONSTRUCTION

Onyx pinch valve housings are available in Cast Iron, with Ductile Iron available as an option. Valve stems and pinch bars are 303 Stainless Steel, or 316 Stainless Steel.

INSTALLATION:

1. Safety considerations.

   a) Leakage: Consider possible flange leakage due to improper tightening of flange bolts. Pinch valves handle abrasive fluids; it may be reasonable to expect the sleeve to eventually wear out. Precautions should be taken where liquids may drip onto electrical equipment or plant personnel, or where combustible fluid may drain into a dangerous area.

   b) After shut down: Pinch valves can hold pressure in a system for a considerable length of time. Means should be provided to safely relieve pressure and drain lines.

2. **Flanges:** Onyx pinch valves are designed to work with standard ANSI 150# (or 300#) **flat face** flanges. No gasket is required; the sleeve face *is* the gasket. Be careful when using Victaulic type flanges, as the grooving machine often leaves a sharp edge inside the flange. This sharp edge will cut the rubber valve sleeve causing premature sleeve failure. Make absolutely sure that the inside edges of mating flanges are filed or ground smooth. Valve flanges have through holes and are designed to have an ANSI hex (not heavy hex) nut behind the flange. Flange bolts must be inserted from the mating flange side.

3. Locate the valve where it can be reached for service and sleeve replacement. Allow access by technicians who may have to calibrate automatic valves. If valve is operated with an auxiliary hand wheel, allow access to the hand wheel. Locate valve so that operators can see relevant gauges.

4. Be sure pipeline is clean. Foreign material left in the pipeline can damage valves. Clean the mating flanges of adjacent pipe. Remove old gasket material.

5. Inspect valve before installation. Report shipping damage before installation. DO NOT INSTALL A VALVE KNOWN TO HAVE BEEN DAMAGED IN SHIPMENT. Check inside the valve to make sure no foreign objects are present.

6. The model CHR & CHP pinch valve can be installed in any position with flow in either direction.

   Do not install valve next to a source of extreme heat.

7. Make sure adjacent pipe is properly aligned. Adjacent pipe must have sufficient travel to insert valve and draw tight to compress sleeve faces; valve will not stretch. Make certain adjacent pipe has sufficient free play for removal and reinstallation of the valve. (Flange gaskets are not required, but may be used for spacers if necessary.) Coat faces of valve sleeve with silicone lubricant to facilitate later removal of the valve and preserve the resiliency of the rubber.

8. Bolt valve into pipe line. Snug up the bolts gently in a criss-cross pattern. It may be necessary to re tighten bolts later after the rubber has taken set.

<table>
<tr><th colspan="4">BOLT TORQ in FT-LB</th></tr>
<tr><td rowspan="2">VALVE SIZE</td><td rowspan="2">NO OF BOLTS</td><td colspan="2">PINCH VALVE & DUCKBILL</td></tr>
<tr><td>*INTIAL TIGHTENING</td><td>*RE-TIGHTENING</td></tr>
<tr><td>1</td><td rowspan="4">4</td><td rowspan="3">30</td><td rowspan="3">50</td></tr>
<tr><td>1.5</td></tr>
<tr><td>2</td></tr>
<tr><td>2.5</td><td>35</td><td>55</td></tr>
<tr><td>3</td><td rowspan="3">45</td><td rowspan="3">65</td></tr>
<tr><td>4</td><td rowspan="4">8</td></tr>
<tr><td>5</td></tr>
<tr><td>6</td><td rowspan="2">50</td><td rowspan="2">70</td></tr>
<tr><td>8</td></tr>
<tr><td>10</td><td rowspan="3">12</td><td rowspan="2">50</td><td rowspan="2">80</td></tr>
<tr><td>12</td></tr>
<tr><td>14</td><td rowspan="3">60</td><td rowspan="3">95</td></tr>
<tr><td>16</td><td rowspan="2">16</td></tr>
<tr><td>18</td></tr>
<tr><td>20</td><td rowspan="2">20</td><td rowspan="2">65</td><td rowspan="2">150</td></tr>
<tr><td>24</td></tr>
<tr><td>30</td><td>28</td><td rowspan="2">75</td><td rowspan="2">175</td></tr>
<tr><td>36</td><td>32</td></tr>
</table>

* Allow at least one hour between the initial and re-tightening.

9. IMPORTANT - INSTALL SUFFICIENT PIPE SUPPORTS TO ISOLATE VALVE BODY FROM EXCESSIVE BENDING MOMENTS.

MAINTENANCE

1. Visually inspect valve periodically.
2. Lubricate valve once a year. Coat stem (#7) where it passes through the yoke adapter (#12) with grease. If valve is in a dusty environment, grease may cause dust to stick to the stem; use light oil instead.

SLEEVE REPLACEMENT

1. Relieve process pressure and drain process line.
2. Open valve.
3. Remove valve from process line.
4. Disconnect any accessories attached to the stem or coupling.
5. Disassemble valve bonnet assembly (#2) by removing bolts, nuts, and washers (#2A, 2B, 2C).
6. Separate upper and lower bonnet halves (#2). By slowly turning the hand wheel clockwise, the bonnet halves can be easily apart without difficulty.
7. If sleeve (#1) is provided with positive opening tabs (integrally molded tabs bolted to the pinch bar), follow steps 'a' through 'e' below. If positive opening tabs are not provided, proceed directly to step 8.

    a) Remove bolts, nuts and washers that secure the positive opening tabs to the pinch bar (#8A, 8B, 8C). The sleeve (#1) is now free from the pinch bar (#8). Discard old sleeve. Prepare new sleeve for installation.

    b) Punch holes through the Positive Opening Tabs using a gasket hole or pliers type punch. Hole diameter in tabs should be approximately equal to hole diameter in the pinch bar.

c) Positive opening tab holes must be punched in proper alignment with respect to the flange face holes, or there will be hell to pay when you reinstall the valve. Make certain that flange holes in the rubber sleeve face match the drilled holes in the metal bonnet assembly. It is very difficult to twist the rubber sleeve to align these holes later.

d) Replace tab bolts, nuts and washers (#8A, 8B & 8C). Use flat washers on every hole. If you replace bolts (#8A), cut or grind flush with nut (#8C) so bolts will not puncture sleeve in closed position.

e) Trim the tabs even with the top of the pinch bar.

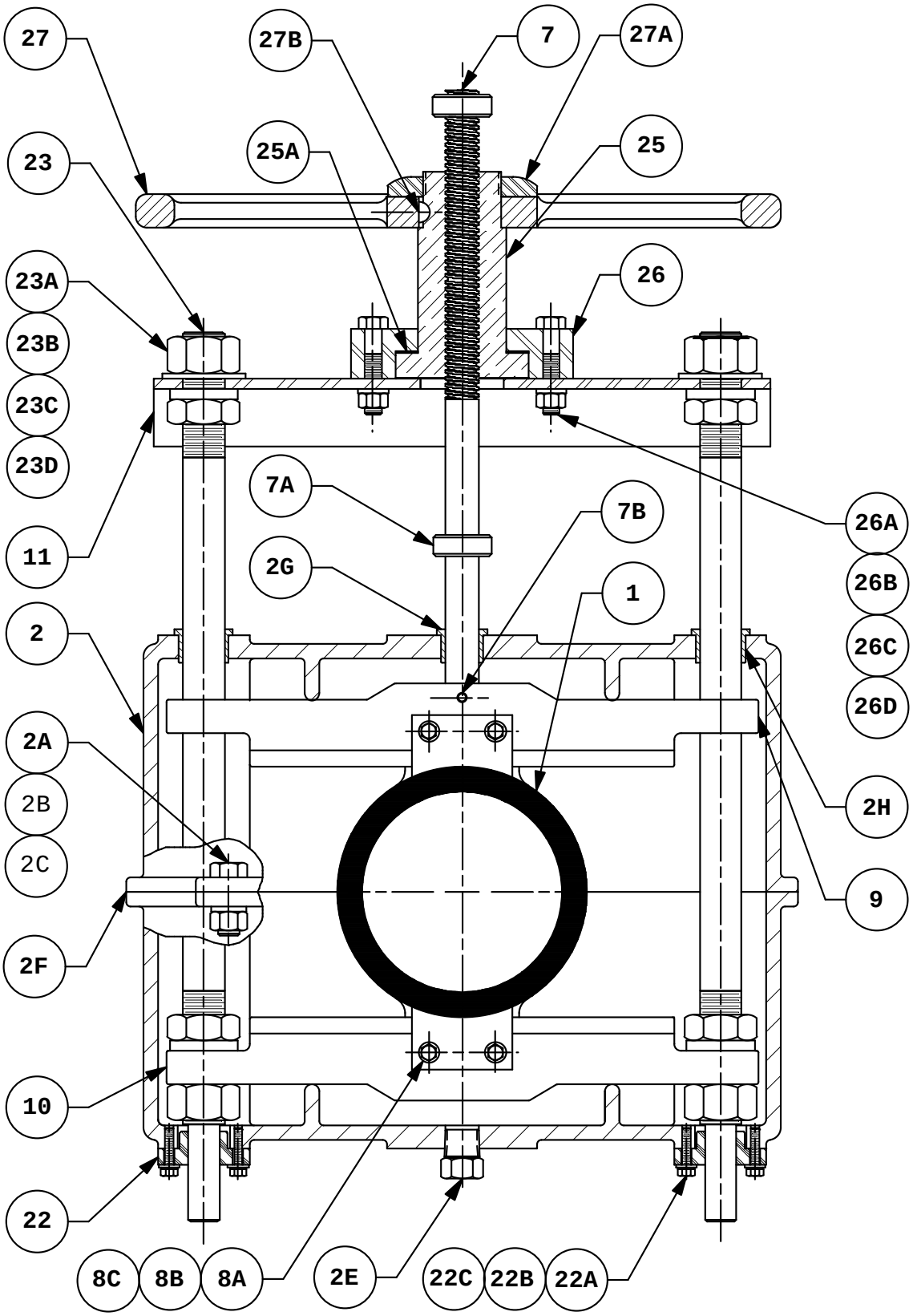
8. If valve is provided with optional bonnet seal kit, remove the yoke adapter (#12) and replace the O-ring (#12B).

9. Insert new sleeve and reassemble the valve bonnets.

10. Apply a coat of silicone sealant to the mating flanges of the bonnet assembly. Bonnets must be matched and oriented as they were originally or bonnet hardware will not line up properly. Replace bonnet hardware(#2A, 2B & 2C).

11. Replace any accessories that were previously removed.

12. Reinstall valve in process line.


27
27B
7
27A
23
25A
25
23A
26
23B
23C
23D
7A
7B
26A
11
2G
1
26B
2
26C
26D
2A
2B
2C
2H
9
2F
10
22
8C
8B
8A
2E
22C
22B
22A

ITEM	NOMENCLATURE
1	SLEEVE
2	BONNET ASSEMBLY
2A	BOLT, BONNET
2B	LOCK WASHER, BONNET
2C	NUT, BONNET
2E	PLUG, BONNET
2F	SEALANT, BONNET
2G	BEARING, BONNET-STEM
2H	BEARING, BONNET-GUIDE ROD
7	STEM, VALVE
7A	MECHANICAL STOP, VALVE
7B	ROLL PIN, STEM-UPPER PINCH BAR
8A	BOLT, POF
8B	WASHER, POF
8C	NUT, POF
9	UPPER PINCH BAR
10	LOWER PINCH BAR
11	YOKE
22	ALIGNMENT BEARING
22A	BOLT, ALIGNMENT BEARING
22B	WASHER, ALIGNMENT BEARING
22C	LOCK WASHER, ALIGNMENT BEARING
23	GUIDE ROD
23A	NUT, GUIDE ROD
23B	WASHER, GUIDE ROD
23C	LOCK WASHER, GUIDE ROD
23D	JAM NUT, GUIDE ROD
25	BRASS NUT
25A	NYLATRON WASHER
26	BRASS NUT CAP
26A	BOLT, BRASS NUT CAP
26B	NUT, BRASS NUT CAP
26C	LOCK WASHER, BRASS NUT CAP
26D	GREASE FITTING, BRASS NUT CAP
27	HAND WHEEL
27A	RETAING NUT, HAND WHEEL
27B	KEY, WOODRUFF

Trouble Shooting:

Symptom:	**Diagnosis**	**How to fix:**
Process fluid is leaking out from around the stem and guide rods.	Sleeve is ruptured	Replace sleeve. See page-15
Process fluid is leaking through valve when it's supposed to be fully closed. Limit switch shows valve is in full closed position.	Wire draw failure through sleeve.	Replace sleeve. See page-15
Leaking through valve seat when valve is supposed to be fully closed. Limit switch shows valve is **not** in full closed position.	Either the actuator limit switch or the actuator torque setting is not correct	Refer to Actuator I&M.
Actuator is running but valve is unable to open or close. Aux hand wheel can't move the valve either.	Actuator drive nut is stripped.	Replace the output drive nut in the electric actuator. See p-13 for why this happened.

ONYX VALVE CO

WARRANTY

The following statement of our Warranty and Claims Policy is intended to assist our customers in understanding the terms of our warranty, the circumstances under which we will honor claims, and the procedure for making claims.

1 Warranty on Products Manufactured by Us.

We warrant Products manufactured by us to be free from defects in material and workmanship for a period of one year from the date of shipment from our factory or warehouse.

Our liability under this warranty or in connection with any other claim relating to our Products is limited to the repair, or at our option, the replacement or refund of the purchase price of any products or parts or components which are returned to us freight prepaid which are defective in material or workmanship. Products or parts or components that are repaired or replaced by us will be returned to our customer freight collet.

With regards to rubber components, Onyx Valve does not guarantee resistance to erosion, abrasion or other sources of failure, nor does Onyx Valve guarantee a minimum length of service or that the product shall be fit for any particular service.

2. Products of Other Manufacturers.

We make no warranty with regard to any products not manufactured by us. The only warranty that attaches to such Products is that warranty, if any, of the manufacturer of such Products. Our Customer Service Department should be consulted if our customers have questions as to whether particular products are covered by our warranty or are separately warranted by their manufacturers.

3 Limitation of Liability.

The only warranty that we make to our customers is that summarized above.

WE DO NOT MAKE ANY OTHER EXPRESS WARRANTIES OR ANY IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE OR USE.

In addition, we do not assume and we expressly disclaim any liability for (i) any special, indirect, incidental, or consequential damages which anyone may suffer as the result of the sale, delivery, servicing, use, or loss of use, of any Product, or (ii) any charges or expenses of any nature that are incurred without our express written consent.

Our total liability under our warranty or in connection with any claim involving any Product is expressly limited to the purchase price of the Product in respect of which damages are claimed.

Failure of purchaser to give prompt written notice of any alleged defect under this guarantee forthwith upon its discovery, or use, and possession thereof after an attempt has been made and completed to remedy defects therein, or failure to return product or part for replacement as herein provided, or failure to install and operate said products and parts according to instructions furnished by Onyx Valve, or failure to pay entire contract price when due, shall be a waiver by purchaser of all rights under these representations. All orders accepted shall be deemed accepted subject to this warranty which shall be exclusive of any other or previous warranty, and shall be the only effective guarantee or warranty binding on Onyx Valve.

4. What Is Not Covered By Our Warranty; Types of Damages and Claims For Which We Are Not Responsible.

The following are examples of the kinds of defects which are not covered by our warranty: defects which are caused by improper installation, improper or abnormal use or operation, or improper storage or handling; defects caused by our customer's failure to perform normal preventive maintenance; defects caused by the use of replacement parts not manufactured or supplied by us; defects caused by repairs by persons not authorized by us; defects caused by modifications or alterations made by our customer, and any damage to our Product occurring while it is in our customer's possession. Since these are examples and not a complete list, we suggest that our customers contact our Customer Service Department if they have any questions concerning the scope of our warranty.

Additional costs incurred by our customers because of delays in delivery are consequential damages for which we are not responsible.

Risk of loss or damage to our Products passes to our customer when we tender our Products to the carrier. Although we cannot process transit damage claims with any carrier on a customer's behalf, we will provide reasonable assistance to our customers when such claims arise.

5. Consultations with Customers.

When so requested, our engineers and other personnel may consult with our customers concerning our Products. While our employees offer their best judgment on any question, the ultimate responsibility for selecting that Product which will perform the functions and applications desired by the customer rests with the customer. As noted above, we make no warranty, express or implied, as to the fitness of any Product for any particular purpose or use.

6. How to Make a Claim.

Within the limits of the terms and conditions set forth on our quotation and acknowledgment forms and in this Warranty and Claims Policy, we will honor reasonable and justified claims when adequate evidence is provided to show that our Product was defective.

Whenever a customer has a claim concerning a Product, the customer should contact the Customer Service Department. CUSTOMERS SHOULD NOT RETURN ANY PRODUCTS OR PARTS OR COMPONENTS TO US WITHOUT FIRST CONTACTING US.

When contacting us, customers should have the following information available:

1. Customer name, location, purchase order number and date of purchase.
2. Serial number.
3. Product/Model number.
4. Equipment installation date.
5. Equipment failure date.
6. Application or service of unit.
7. Details of claim.

We shall have the option of requiring the return of the defective product to our factory, with transportation charges prepaid, to establish the claim and our liability shall be limited to the repair or replacement of the defective product, F.O.B. our factory. Onyx Valve Co will not assume costs incurred to remove or install defective products nor shall we incur back charges or liquidated damages as a result of warranty work.

We will notify the customer whether it will be necessary to return the Product or part or component to us. If so, we will issue the customer an "AUTHORIZED RETURN GOODS NUMBER" that must be attached to the Product or part or component before returning it. All items returned to us must be returned freight prepaid.

If we determine that the Product or part or component is defective and that the defect is covered by our warranty, we will, as explained above, correct the defect or refund the purchase price.

Customers should promptly inspect all Products upon delivery. Customers must make claims for shortages within 20 days after the date of shipment from our factory or warehouse. We suggest that shortages be noted on the bill of lading or packing list, which should then be sent to our Customer Service Department for verification.

All other claims must be submitted within 60 days after the date of shipment from our factory or warehouse, or in the case of an alleged breach of warranty, within 60 days after the date within the warranty period on which the defect is or should have been discovered.

Claims may not be deducted from payments made to us unless we have so agreed in writing in advance.

Questions?

Contact Onyx Valve Company

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